Lecture 25 - Project Lecture

Today's Talk about the project.

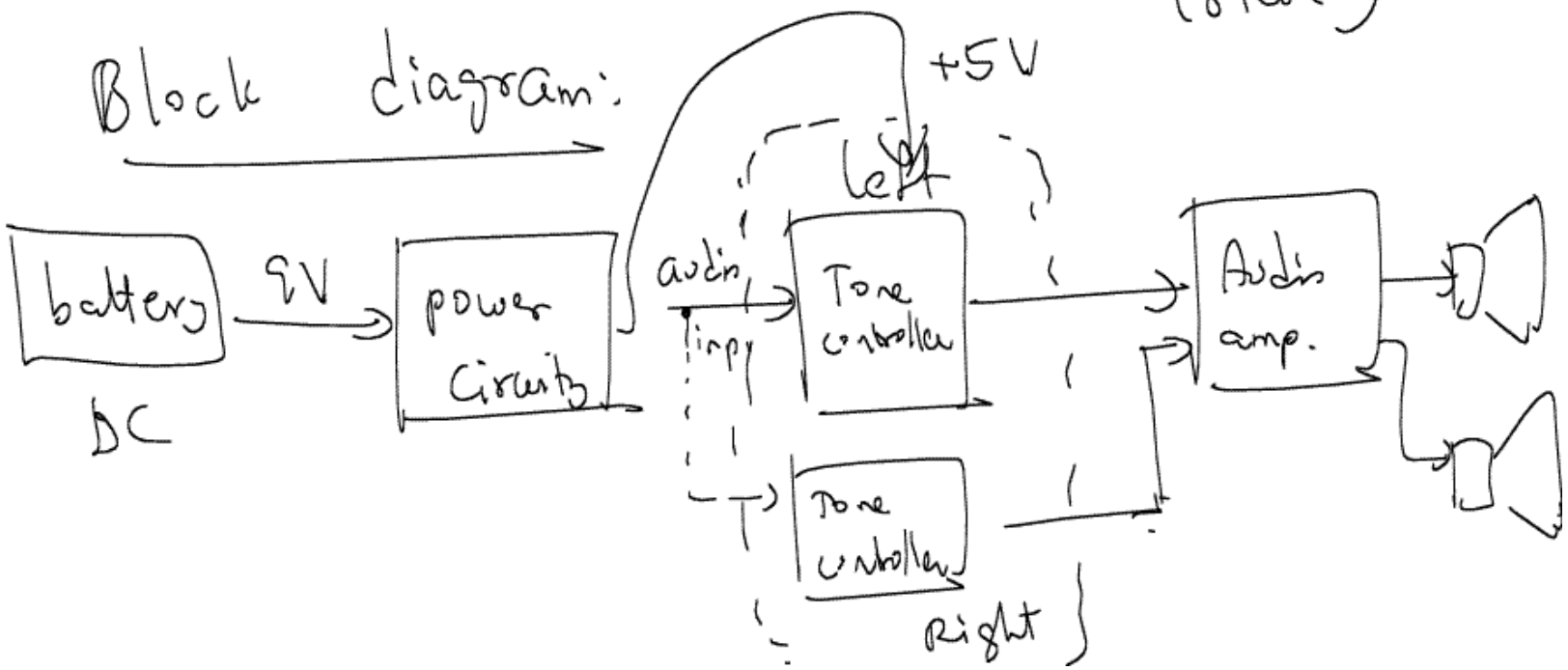
- Bart: Some details about your project
- John: (audio guy) overall view of audio stuff.

Your project:

(Q:) What is it?

A: Tone Controller / Treble-Bass amplifier. (stereo)

Block diagram:



(Q) Why ????

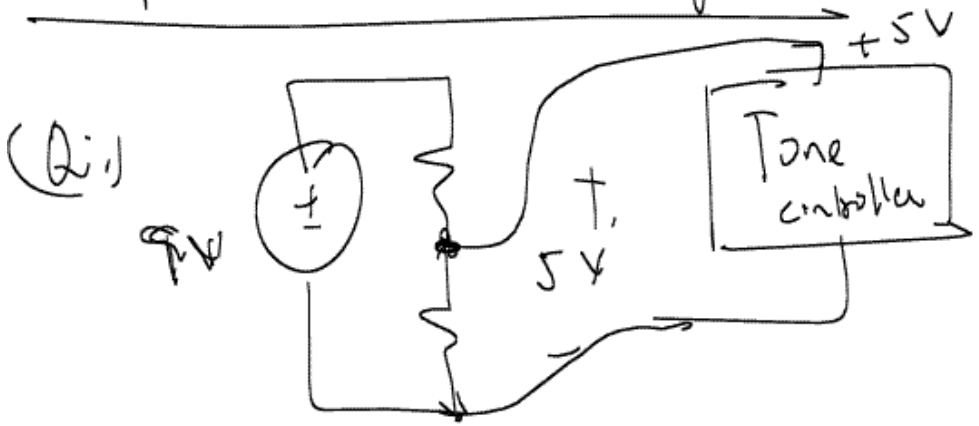
(1) one of the first projects which EE people build

(2) Easy to build, easy to understand qualitatively.

(3) Very ~ Good project to understand the limitations of theory.

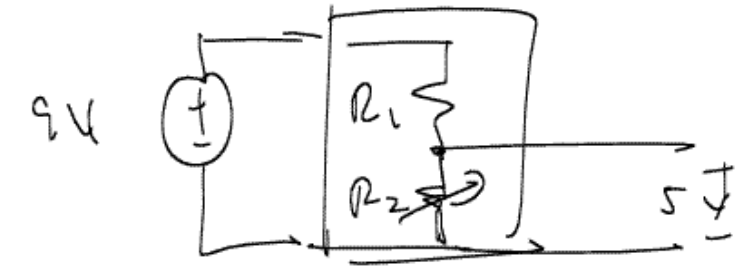
(4) Cheap!

Component of your project



bad, because a real battery cannot put out steady 9V

Solution: "Linear Low drop out regulator."
aka "Smart voltage divider"



R_2 will be adjusted to provide 5V "as long as it can"

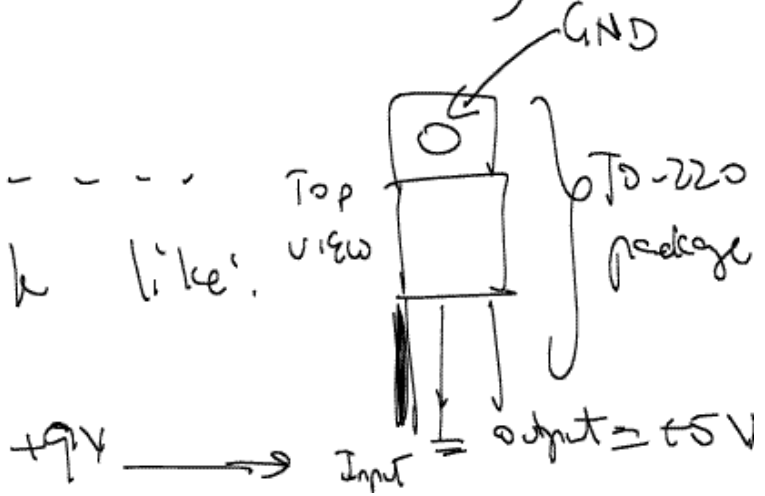
"as long as it can" means Δ between V_{in} (9 V) & V_{out} (5 V) should be at least 1.2 V

(Q:) How do you choose a regulator?

(A:) Look at datasheets from companies (eg: motorola, National Semiconductor ...)

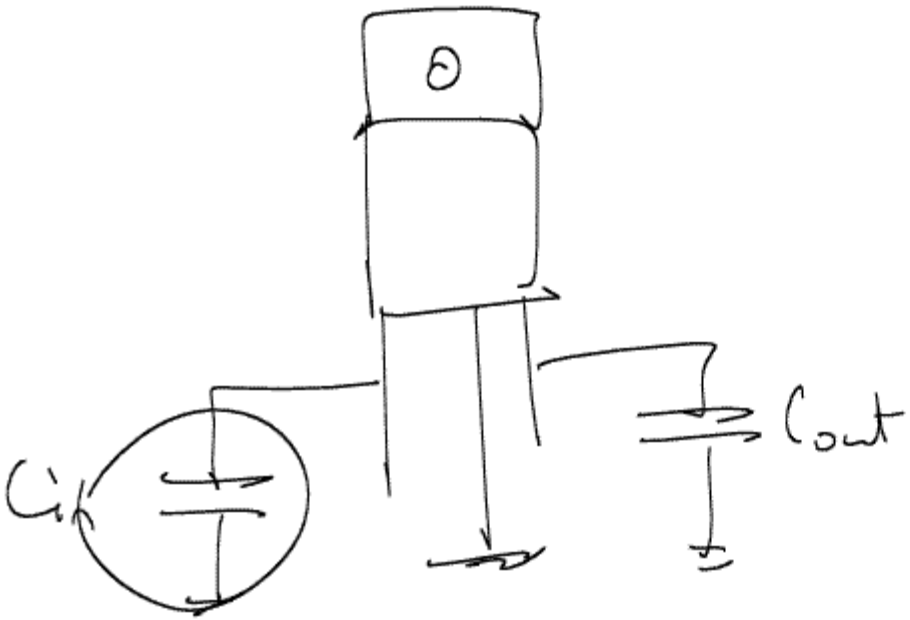
eg: LM2940, LM108 ....

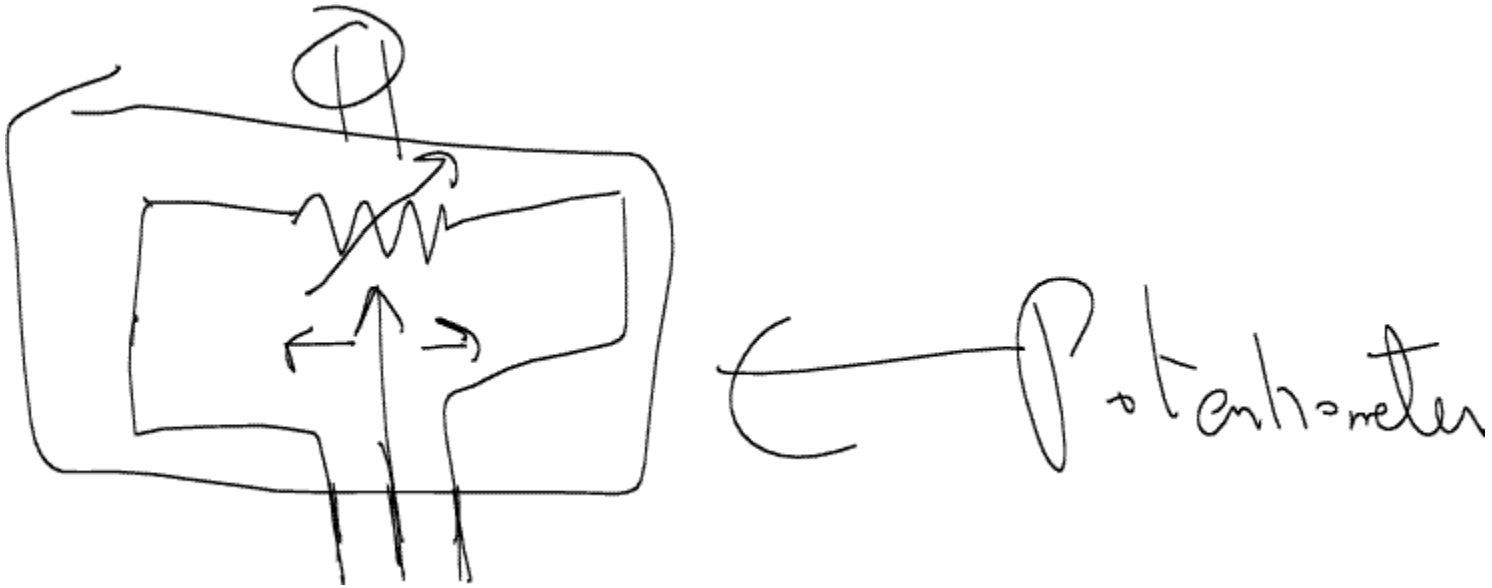
In reality, regulators look like:

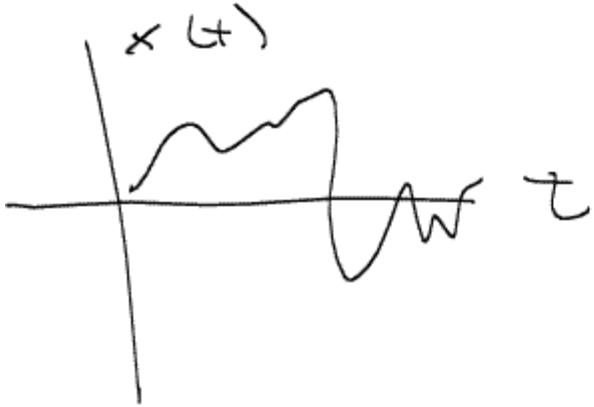


Note: You need filter capacitors at the input & output.

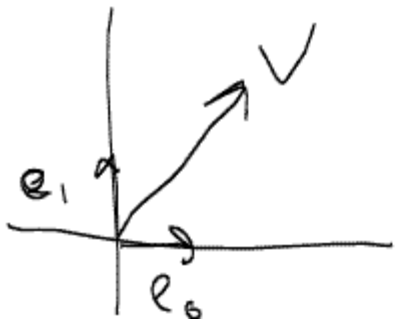
Caps. help filter out noise.



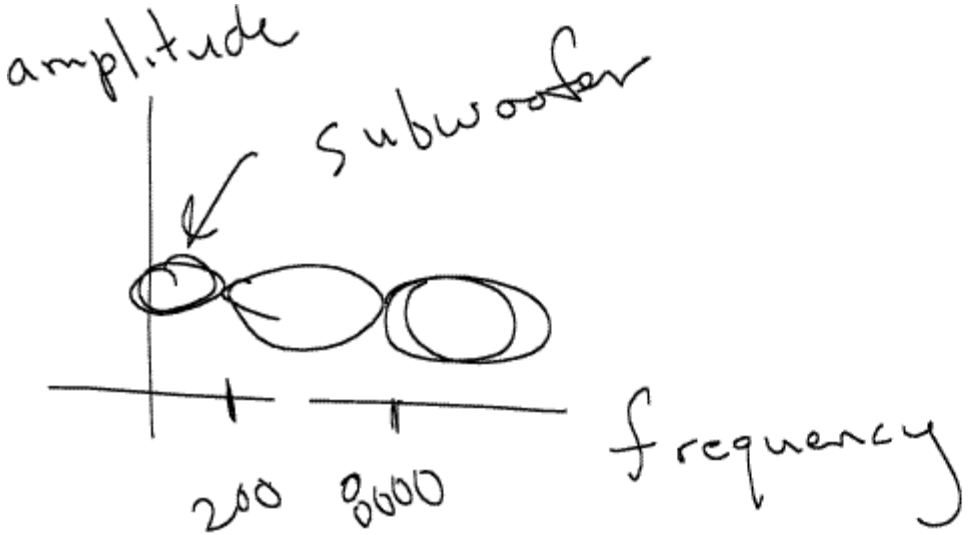

Potentiometer



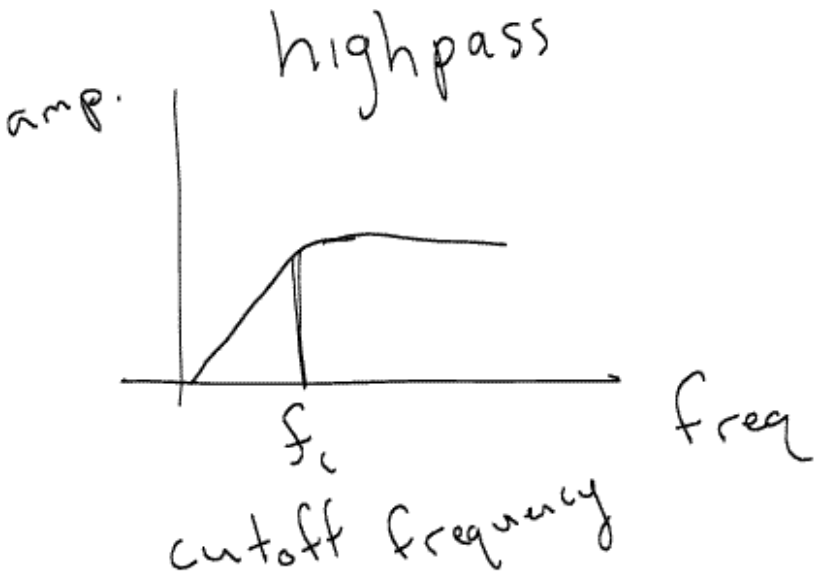
$$x(t) = a_0 + a_1\cos(t) + b_1\sin(t) + a_2\cos(2t)$$



$$v = c_0 e_0 + c_1 e_1$$


amplitude
subwoofer
200
8000
frequency


amp
low pass filter
freq
20Hz
20kHz
freq



Speakers

Standard 8 Ω

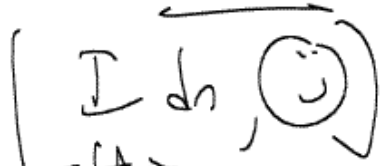
$(20mA)^2 R$

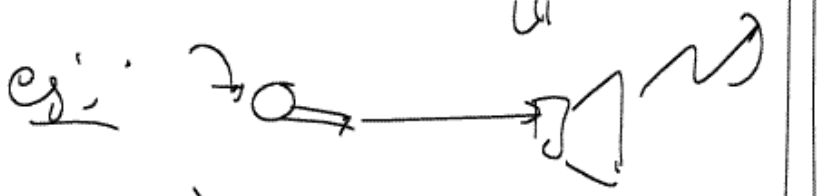
$(.02)^2 8$

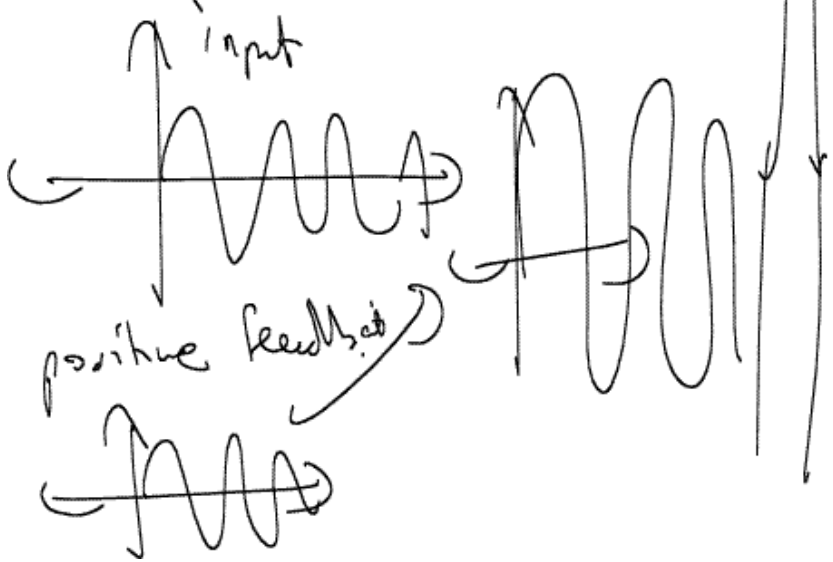
$(.0004)8$ $.0032W$

$3.2mW$

Control







Audio

phase difference is not important because as humans, we can't "hear" phase differences.

John's comment: phase difference in audio means time delay